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Comparetti

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[54] **SEMI-FLUSH FLAPPER VALVE**

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[51] **Int. Cl.**[5] **E03D 1/35**

[52] **U.S. Cl.** **4/404**; 4/393; 4/325

[58] **Field of Search** 4/324, 325, 378, 392, 4/393, 395, 404, 403, 415, 379, 381, 382, 387

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,964,109	6/1976	Street et al.	4/393 X
4,910,812	3/1990	Comperetti	4/325
4,937,894	7/1990	Hill, Jr. et al.	4/404 X
4,969,218	11/1990	Comparetti	4/325

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[57] **ABSTRACT**

A semi-flush flapper valve apparatus is provided for use in a toilet and consists of a two position operable flush handle on the toilet tank. A main flapper valve has a bleeder valve pivotally mounted thereto. The operating handle is rotated in a first direction to operate the main flapper valve normally thereby causing a conventional full flush cycle in the toilet tank. The operating handle is rotated in a second direction to open the bleeder valve and operate the main flapper valve together thereby venting air from the main flapper valve so as to make the main flapper valve close faster causing a semi-flush cycle in the toilet tank.

5 Claims, 2 Drawing Sheets

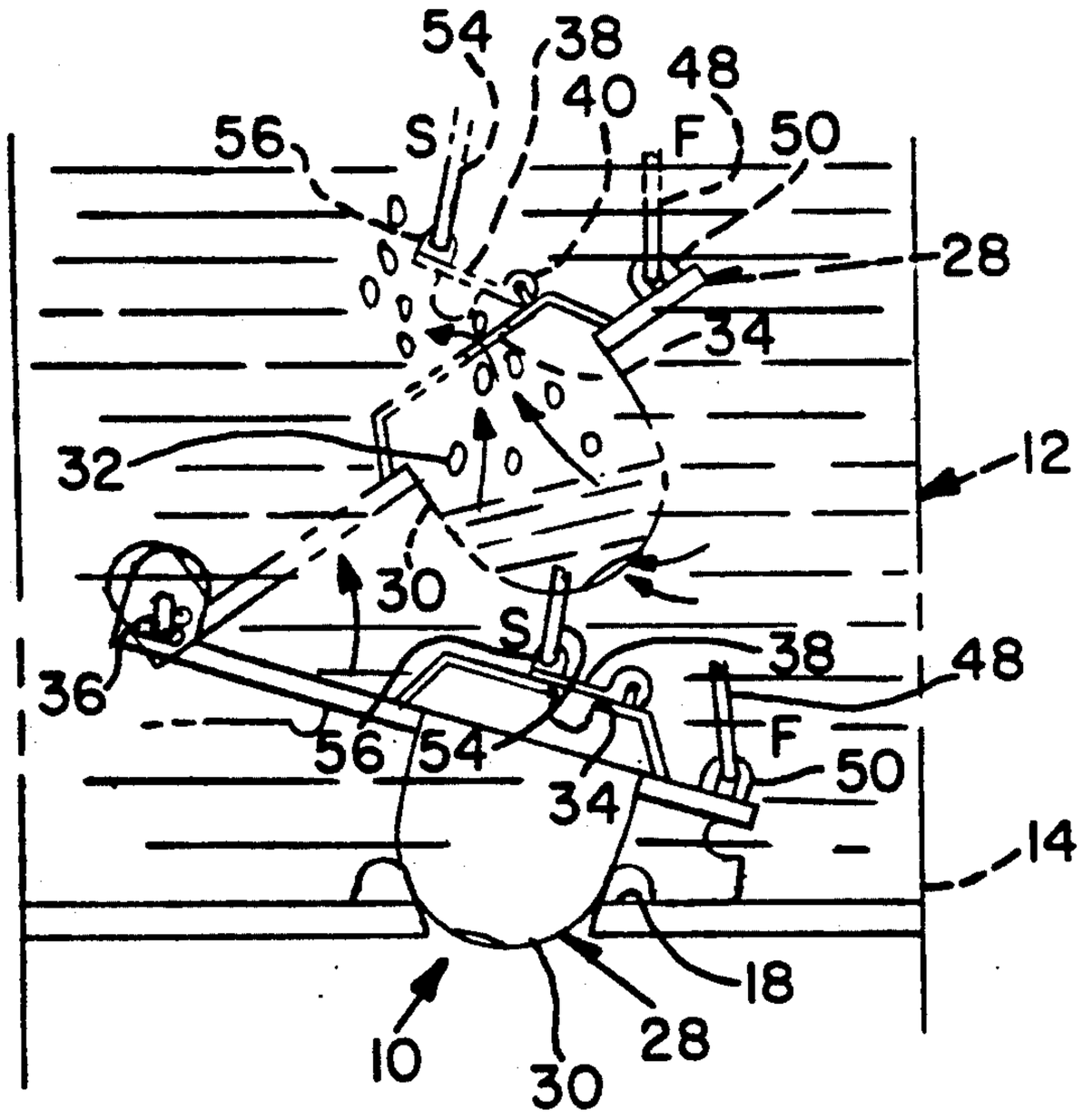


FIG. 1

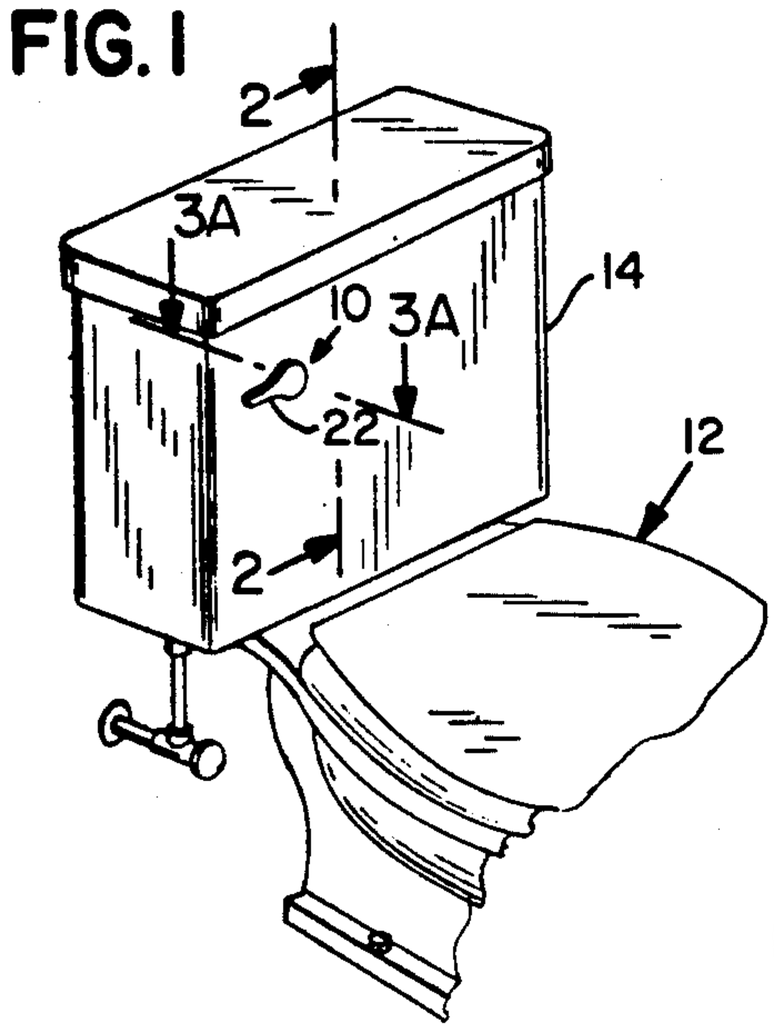


FIG. 2

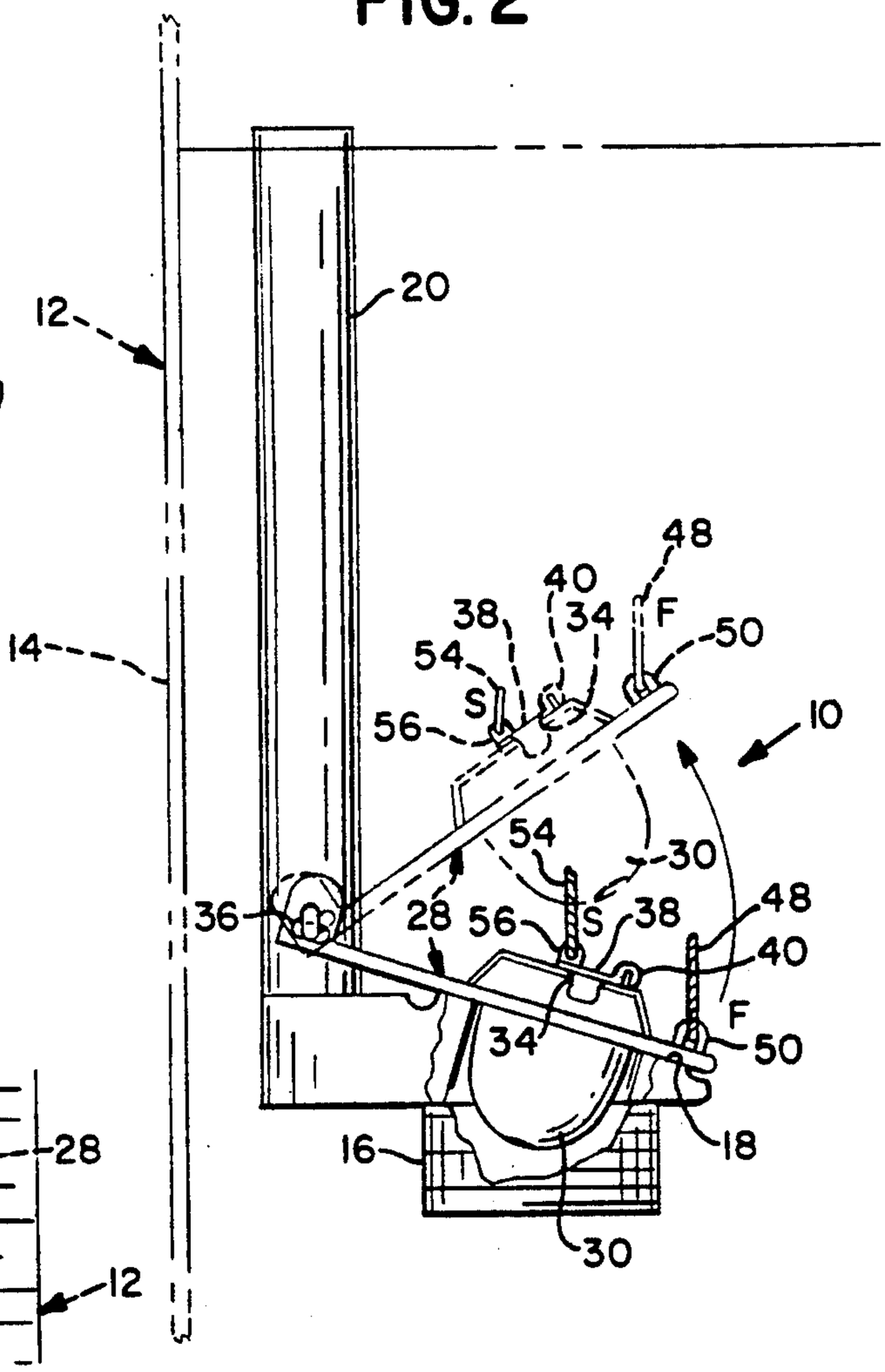


FIG. 4

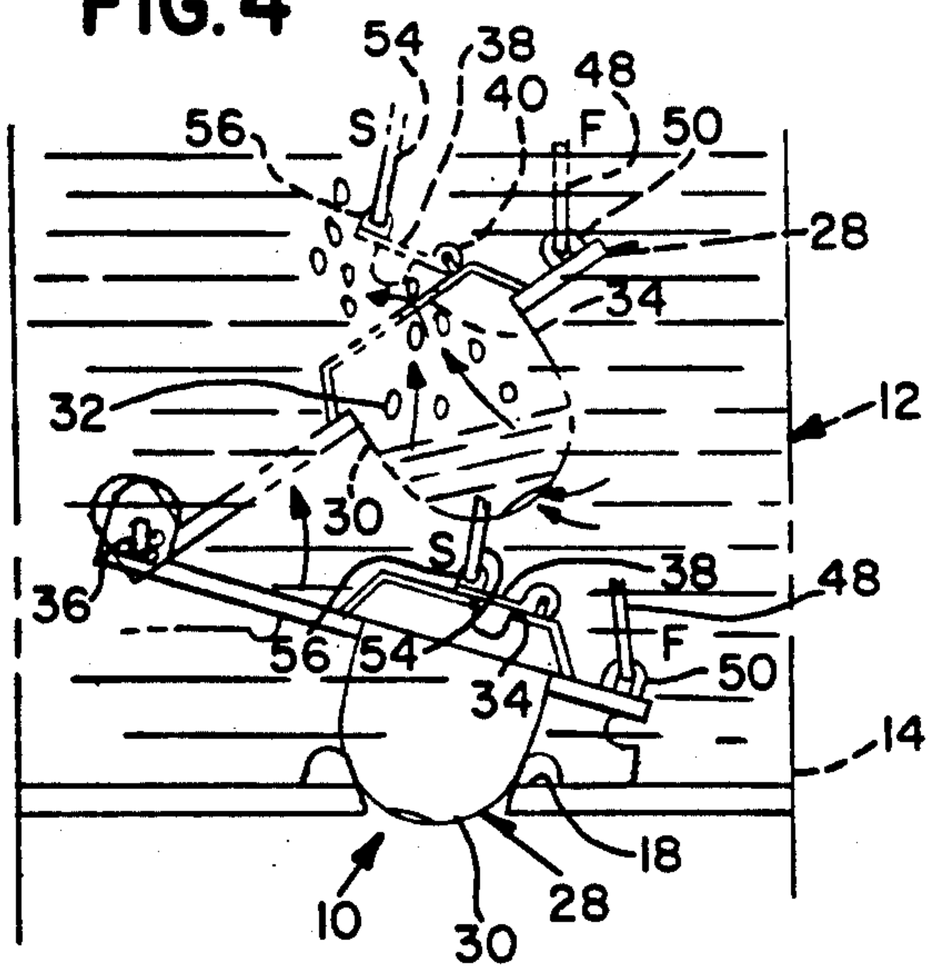


FIG. 3A

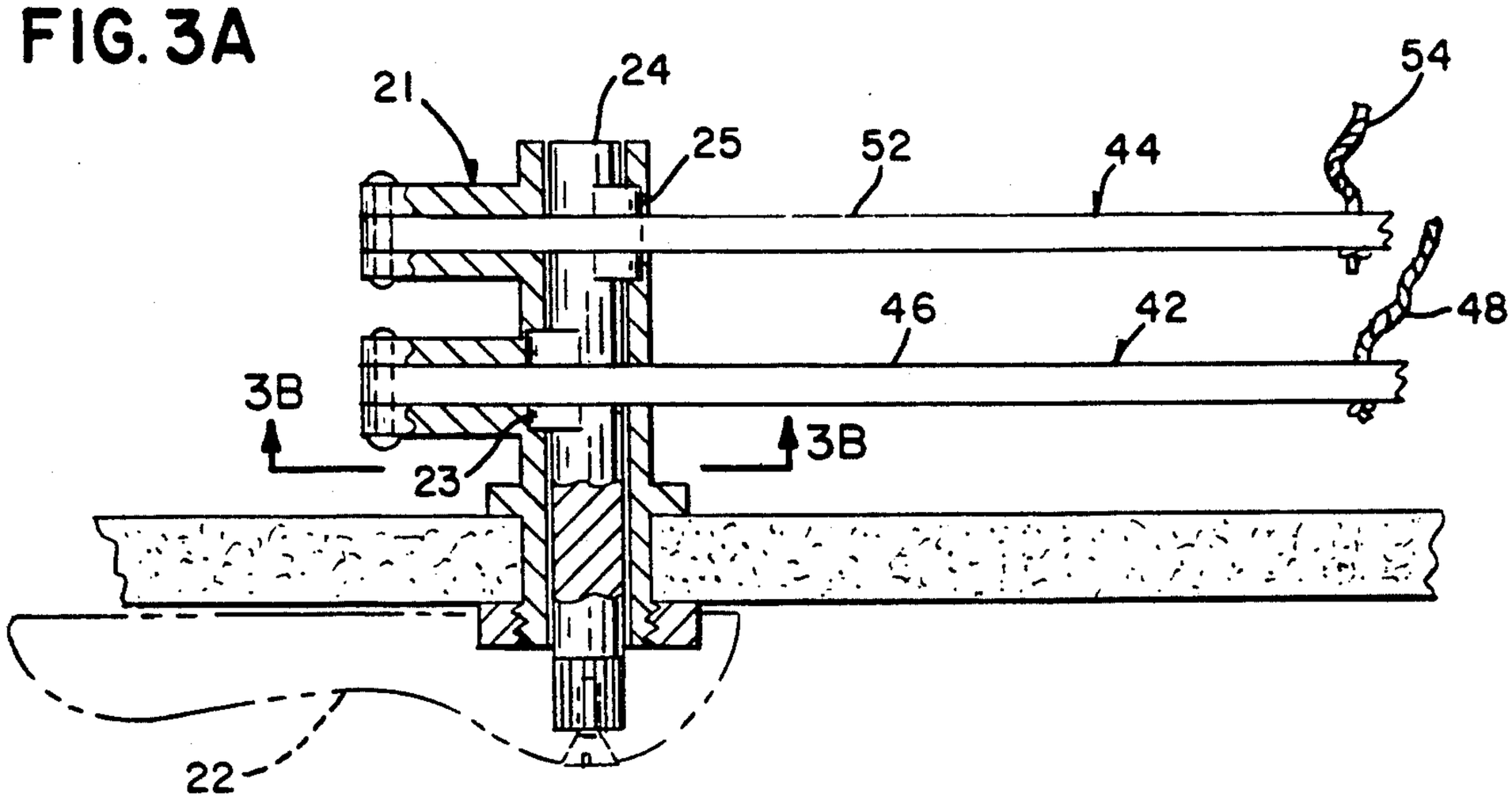


FIG. 3B

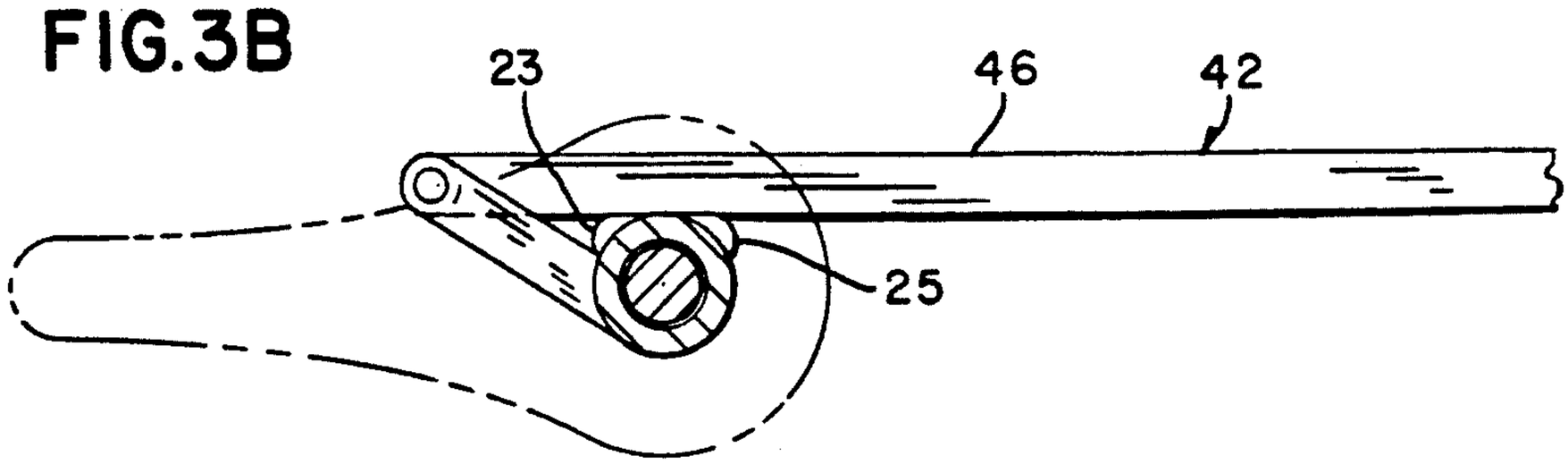
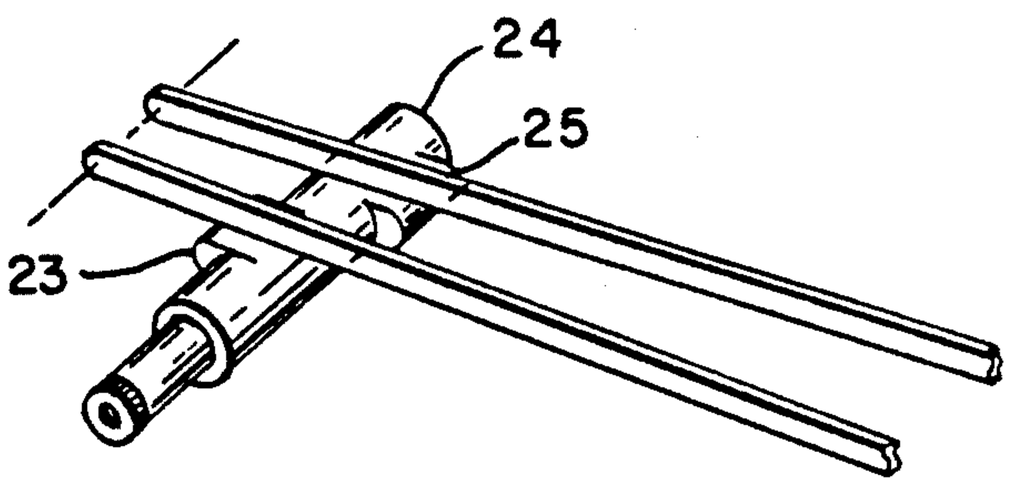


FIG. 3C



SEMI-FLUSH FLAPPER VALVE

BACKGROUND OF THE INVENTION

The instant invention relates generally to toilet flush valve systems and more specifically it relates to a semi-flush flapper valve apparatus.

Numerous toilet flush valve systems have been provided in the prior art that are adapted to regulate the volume of water discharged for flushing when evacuating toilet bowls. For example, U.S. Pat. Nos. 3,325,828 to Alexander; 4,483,024 to Trosh; 4,502,984 to Burns 4,620,331 to Saguelo and 4,910,912 & 4,969,218 to Comparetti all are illustrative of such prior art. While these units may be suitable for the particular purpose to which they address, they would not be as suitable for the purpose of the present invention as hereafter described.

SUMMARY OF THE INVENTION

A primary object of the present invention is to provide a semi-flush flapper valve apparatus that will overcome the shortcomings of the prior art devices.

Another object is to provide a semi-flush flapper valve apparatus that includes an operating handle rotatively mounted to the toilet tank such that said operating handle can rotate in a first direction to cause a full conventional flush and in a second direction to cause the tank to empty only partially.

An additional object is to provide a semi-flush valve apparatus that is simple to install as a replacement for a more conventional device and yet easy to use.

A still further object is to provide a semi-flush flapper valve apparatus that is economical in cost to manufacture.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, this invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only and that changes may be made in the specific construction illustrated and described within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

The figures in the drawings are briefly described as follows:

FIG. **1** is a diagrammatic perspective view with parts broken away of a toilet having the instant invention installed thereon;

FIG. **2** is a diagrammatic cross sectional view with parts broken away taken on line **2—2** of FIG. **1**;

FIG. **3A** is a diagrammatic cross sectional view with parts broken away taken on line **3A—3A** of FIG. **1**;

FIG. **3B** is a cross sectional view taken on line **3B—3B** in FIG. **3A** with the outline of operating handle shown in phantom for clarity;

FIG. **3C** is a diagrammatic perspective view illustrating the cooperative relationship between the shaft and alternately operable lift arms; and

FIG. **4** is a diagrammatic cross sectional view with parts broken away also taken on line **2—2** of FIG. **1**, illustrating a partial flush taking place.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, the figures illustrate a semi-flush flapper valve apparatus **10** for use in a toilet **12** of the type having a tank **14**, a flush port **16**, a valve seat **18** and an overflow tube **20**. The apparatus **10** consists of an operating handle **22** rotatively mounted to the toilet tank so that the operating handle can rotate in a first direction and in a second direction. The operating handle **22** is secured to the shaft **24** by means of a set screw. The shaft **24** is constructed having two cams, each of which will alternately operate one of the two lift arms respectively as the shaft is rotated in a first direction or in a second direction. A main flapper valve **28** has a chamber **30** for holding air **32** therein and a top air release hole **34**. The main flapper valve **28** is pivotally mounted at one end **36** to the overflow tube **20**, so as to normally sit upon the valve seat **18** over the flush port **16**. A bleeder valve **38** is oppositely pivotally mounted at one end **40** onto the main flapper valve **28** to normally cover the top air release hole **34**. When the bleeder valve **38** is opened, it will release the air **32** from the chamber **30** in the main flapper valve **28**. A first mechanism **42** is coupled between the operating handle **22** and the main flapper valve **28**, for causing a conventional full flush cycle in the toilet tank **14**, when the operating handle **22** is rotated in a first direction on the toilet tank **14**, so as to normally open and close the main flapper valve **28** on the valve seat **18**. A second mechanism **44** is coupled between the operating handle **22** and the bleeder valve **38**, for causing a semi-flush cycle in the toilet tank **14**. When the operating handle **24** is rotated in a second direction on the toilet tank **14**, it causes to open the bleeder valve **38** and simultaneously pulls up the main flapper valve **28**, allowing the main flapper valve **28** to close faster onto the valve seat **28** because air is vented out of the bleeder valve **38** as previously indicated.

The first mechanism **42** includes a first lift arm **46** pivotally mounted to shaft housing **21** and resting in close proximity to the first cam **23** on shaft **24**. This first lift arm **46** will be pushed upward by the cam **23** when the operating handle **22** is rotated in a first direction. A first flexible lanyard **48** is connected between an end of the first lift arm **46** and a loop **50** on the main flapper valve **28** oppositely from the pivotally mounted end **36** thereof.

The second mechanism **44** includes a second lift arm **52** also pivotally mounted to the shaft housing **21** and resting in close proximity to the second cam **25** on the shaft **24**. This second lift arm **52** will be pushed upward by the second cam **25** when the operating handle **22** is rotated in a second direction. A second flexible lanyard **54** is connected between an end of the second lift arm **52** and a loop **56** on the bleeder valve **38** oppositely from the pivotally mounted end **48** thereof. The main flapper valve **28** and the bleeder valve **38** are both fabricated out of flexible durable waterproof material, such as rubber or soft plastic.

The size of the top air release hole **34** will determine how soon the main flapper valve **28** will return to the valve seat **18** and hence the amount of water that flushes through the toilet **12**. The bleeder valve **38** is fitted to the main flapper valve **28** in such a way that when the tank **14** is full the water pressure will press the main

flapper valve **28** to seat firmly. When the first flexible lanyard **48** is pulled for a full flush the bleeder valve **38** will remain closed so that the full flash is achieved.

While certain novel features of this invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A semi-flush flapper valve apparatus for use in a toilet of the type having a tank, a flush port, a valve seat and an overflow tube, said apparatus comprising:

a) an operating handle rotatively mounted to the toilet tank, so that the operating handle can rotate both in a first direction and in a second direction;

b) a main flapper valve having a bottom chamber for trapping air therein and a top air release hole, said main flapper valve is pivotally mounted at one end to the overflow tube, so as to normally sit upon the valve seat over the flush port with said bottom chamber communicating with said flush port;

c) a bleeder valve which is pivotally mounted at one end onto said main flapper valve to normally cover the top air release hole;

d) a first means, coupled between said operating handle and said main flapper valve, for causing a conventional full flush cycle in the toilet tank, when said operating handle is rotated in a first direction on the toilet tank, so as to pivot said main flapper valve about said one end while said bleeder valve remains closed over said air release hole;

e) a second means, coupled between said operating handle and another end of said bleeder valve, for causing a semi-flush cycle in the toilet tank, when said operating handle is rotated in a second direction on the toilet tank, whereby said bleeder valve will pivot about said pivotal mounting to open said air bleeder hole and pull up said main flapper valve, allowing said main flapper valve to subsequently close faster than normal onto the valve seat due to lack of buoyancy thereof.

2. A semi-flush flapper valve apparatus as recited in claim **1**, wherein said first means includes:

a) a first lift arm coupled to said operating handle, so that said first lift arm will be lifted when said operating handle is rotated in a first direction; and

b) a first flexible lanyard connected between an end of said first lift arm and a loop on said main flapper valve oppositely from the pivotally mounted end thereof.

3. A semi-flush flapper valve apparatus as recited in claim **2**, wherein said second means includes:

a) a second arm lift coupled to said operating handle, so that said second lift arm will be lifted when said operating handle is rotated in a second direction; and

b) a second flexible lanyard connected between an end of said second lift arm and a loop on said bleeder valve oppositely from the pivotally mounted end thereof.

4. A semi-flush flapper valve apparatus as recited in claim **3**, wherein said main flapper valve and said bleeder valve are both fabricated out of flexible durable waterproof material.

5. A semi-flush flapper valve apparatus as recited in claim **1**, further comprising:

a) a shaft fixedly secured to said operating handle and having a first cam and second cam integrally formed thereon and which rotate when said operating handle is rotated;

b) a first lift arm which is pivotally mounted to said housing which is caused to be raised by contact with said first cam only when said operating handle is rotated in said first direction;

c) a second lift arm which is pivotally mounted to said housing which is caused to be raised by contact with said second cam only when said operating handle is rotated in said second direction.

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